



20-year measurements of Brewer spectrophotometer at the King Sejong station, Antarctica

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At the King Sejong station (164.23°E, 74.62°S) in the King George Island, Antarctica (operated by the Korea Polar Research Institute), a ground-based Brewer spectrophotometer has observed the total ozone column (TOC) and solar ultraviolet (UV) irradiance during 20-year since 1999. TOC is measured from two measurements, direct sun and zenith sky. The observations from both measurements are examined and compared with Ozone Monitoring Instrument (OMI) for the estimation of seasonal variation and long-term trend. As a result, TOCs from the direct sun measurement are overestimated than TOCs from the zenith sky measurement. Additionally, OMI-observed TOCs overestimates TOCs from both measurements by Brewer. The long-term data reveals the recent ozone hole recovery, while the springtime TOCs during spring shows the negative trend during 2006 – 2011. The trends of monthly mean TOCs are analyzed by linear regression method. Monthly mean TOCs show positive trends except for October and November. In case of DS measurement in October and both measurements in November, monthly mean TOCs show negative trends. Due to the seasonal variation of solar UV irradiance, we examine three months mean solar UV irradiance for every five years. First five years mean shows a higher value than the other 5-year means in austral spring and summer. Additionally, correlation between TOC and solar UV irradiance is analyzed for each month. We find that the minimum correlation appears around 305 nm during austral spring (September, October, and November). In particular, correlation coefficients lower than -0.8 appear in October (around 299.5 – 308.0 nm) and November (around 297.0 – 304.5 nm).